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| ERIC ROBINSON PMB 955 21010 SOUTHBANK ST. POTOMAC FALLS, VA 20165 | | | EXAMINER TUROCY, DAVID P | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 09/847,308 | Applicant(s) ARAI, YASUYUKI | |
| | Examiner David Turocy | Art Unit 1792 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-59 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-59 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. Applicant's amendments, filed 9/19/2007, have been fully considered and reviewed by the examiner. The examiner notes the amendment to claims 1-4, 21, 22, 39, and 51 and the cancellation of claims 60-67. Claims 1-59 are pending in the instant application.

Response to Arguments

2. Applicant's arguments filed 9/19/2007 have been fully considered but are deemed moot because they are directed to newly added limitations that were not present at the time of the prior rejection and will be addressed in the newly applied prior art rejection to follow.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-8, 13-20, 34-35, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis et al. (U.S. Patent 5,902,688, hereafter '688) in view of Nagashima et al. (US Patent 6,101,316, hereafter '316) and further in view of Onitsuka et al. (U.S. Patent 6,049,167, hereafter '167), Burrows et al. (Journal of Crystal Growth)

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and Ardaillon et al. (US Patent 5225238, hereafter Ardaillon '238), and Wadley et al. (U.S. Patent 5,534,314, hereafter '314).

Claim 1: '688 teaches a method of manufacturing a light-emitting device, comprising the steps of:

placing (i.e., filling) an organic electroluminescence (EL) material into a crucible (i.e., an evaporation cell) (col. 9, lines 15-25; Fig. 10); and

heating the organic electroluminescence material to form a patterned light emitting layer (109, 110) on a substrate (103) (col. 5, lines 55-67; col. 6, lines 33-51).

With respect to the evaporation cell comprising a first portion and a second portion having a diameter smaller than the first portion and ejecting the material from the end portion of the second portion. It is the examiners position, giving the claims their broadest reasonable interpretation, that a crucible, as taught by '688, comprises a first portion and second portion, where the first portion corresponds to the outer diameter of the cell and the second portion corresponds to the inner diameter of the cell. In other words, the outside of the cylinder wall is the first portion of the cell that has the larger diameter then the inner diameter of the cylinder wall. Also the examiner notes that the end of the second portion is where the material is ejected to the substrate as required by the claims as written. During patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification" by giving words their plain meaning unless the specification provides a clear definition. See *In re Prater* 415 F.2d 1393 1404-05 162 USPQ 541 and *In re Zletz* 893 F.2d 319, 321, 13 USPQ2d 1320.

Alternatively, the examiner cites US Patent 6101316 by Nagashima, discloses various formation of evaporation cells, including among others, a cell that has a second portion that has a smaller diameter than a first portion, see figure 3 and 8d. Therefore it would have been obvious to one of ordinary skill in the art to have modified '688 by using the evaporation cell as taught by '316 because such are taught by '316 as known and suitable cells for use in the evaporation apparatus. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

'688 teaches that the evaporation occurs under vacuum conditions (col. 9, lines 15-17), but is silent as to the atmosphere. Therefore, it does not teach that the vacuum atmosphere should be an inert gas. '688 seeks to solve the problem of degradation of the material by oxidation during processing (col. 2, lines 28-49).

'167 also teaches a method of manufacturing organic EL devices and is also concerned with the degradation of the EL layer (In this case by the effects of moisture) (col. 1, lines 10-32). '167 also teaches that the layers may be deposited by vacuum evaporation (col. 12, lines 31-67) and teaches that the EL layer forming steps in the presence of an inert gas (Abstract). '167 does not explicitly teach that the evaporation source is an organic EL material filled into a cell.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have performed the vacuum deposition of '688 in the inert gas of '167 because '167 teaches that organic EL layers may be deposited by vacuum

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evaporation in inert gas, and further because '167 suggests that the use of inert gas avoids degradation that would have been experienced using moisture-containing atmospheres.

'688 and '167 teach that the evaporation takes place under vacuum conditions (i.e., below atmospheric pressure). They do not teach that the evaporation takes place at atmospheric pressure. Vacuum evaporation, as described by '688 and '167, is a physical vapor deposition (PVD) technique.

Burrows discloses organic material is known and suitable in the art to be evaporated at atmospheric pressure using resistive heating (page 93) and Ardaillon '238 discloses that the evaporation of organic material is directly related to the pressure and the temperature within the chamber and one skilled in the art is capable of adapting the operating conditions, i.e. the temperature and pressure, to obtain the best evaporation of the organic material. (Column 3 lines 45-55). Ardaillon '238 also discloses evaporation pressure is directly related to temperature, wherein to evaporate at an increased in pressure the temperature must be increased. (Column 3 lines 45-55). Additionally, Wadley '314 teaches an evaporation method in which a crucible (i.e., an evaporation cell) is filled with an evaporation source and directed to the deposition substrate in the presence of an argon at up to atmospheric pressure (col. 5, lines 50-64; col. 11, lines 8-12). While Wadley is directed to e-beam evaporation using a water-cooled crucible, Wadley clearly discloses that evaporation via resistive heating is operable for materials that have a low melting point (column 7, lines 24-35). Therefore Wadley suggests to one of ordinary skill in the art that using resistive heating to

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evaporate low melting point materials to provide rapid evaporation. Also Wadley suggests evaporating using a gas to direct to the evaporant onto the substrate provides the advantage of not having to use high vacuum, which requires expensive equipment and allows for inefficient material utilization and only line of sight deposition (column 1, lines 55-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have heated the crucible at atmospheric pressure as suggested by Burrows with a reasonable expectation of successfully providing a film because Burrows discloses atmospheric pressure is known and suitable in the art to evaporate organic material and Ardaillon '238 discloses adjusting the temperature and pressure in the chamber will provide efficient evaporation of organic materials such as increasing the pressure. Additionally one would be motivated to use atmospheric pressure to reap the benefits of higher efficiency, lower cost, and lower vacuum requirements as suggested by Wadley '314.

Claims 2 and 4: '688 teaches that the evaporation cell containing the EL material(s) are placed in a reaction chamber (163), with (a) shutter(s) (173) over the source of the evaporation cell(s) (col. 9, lines 15-37; Fig. 10).

'688 teaches opening and closing the shutter to form a light emitting layer on the substrate comprising the organic EL material (col. 9, lines 30-37).

Claims 3 and 4: '688 teaches that the shutters are opened and closed to perform "selective deposition" of the materials, including the EL material (col. 9, lines 30-33).

Claims 5-8: '688 teaches that more than one evaporation cell may be provided (Fig. 10; col. 9, lines 15-37).

Claims 13-16: The organic EL materials may include Alq₃, a small molecule material (See Spec., p. 18, lines 3-6).

Claims 18-20: Wadley '314 is open to the use of other evaporant sources (col. 15, lines 15-25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided multiple shuttered sources as taught by Antoniadis '688 in order to have provided the separate layers of the EL device (as discussed above).

Claims 34-35 and 38: In evaporation, the deposited material travels directly from the source to the substrate.

5. Claims 9-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238 and Wadley '314 as applied to claims 1-4 above, and further in view of Rallison et al. (U.S. Patent 5,945,967, hereafter '967).

'688, '316, '167, Burrows, Ardaillon '238, and '314 and are discussed above. '688 teaches the use of EL devices to display photographic images (col. 2, lines 55-56), but it does not explicitly teach their use for video or digital camera displays.

'967 teaches that electroluminescent displays are suitable for forming video camera displays (col. 1, lines 13-30). The selection of a known material based on its suitability for its intended use has been held to support a *prima facie* case of

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obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the EL device produced by the method of '688, '316, '167, Burrows, Ardaillon '238, and '314 as a video camera display with a reasonable expectation of success because '967 recognized the suitability of EL devices for video camera displays.

6. Claims 21-24, 39, 42-43, 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238 and Wadley '314 as applied to claims 1-4 above, and further in view of Peng (U.S. Patent 6,495,198, hereafter '198).

'688, '316, '167, Burrows, Ardaillon '238, and '314 are discussed above. They do not explicitly teach moving the substrate and the source in relation to one another.

'198 teaches that moving the substrate and organic electroluminescent sources relative to one another in order to form blurred junctions and thereby improve the conductivity between layers (col. 3, lines 31-61; col. 5, lines 25-31). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have moved the substrate and the depositional source relative to one another in order to have improved the conductivity between layers of the EL device of '688 by blurring the junction between the layers.

Claims 23-24 and 39: The evaporation cell may be moved during the deposition step (col. 4, lines 25-46).

Claims 42-43: The substrate may be moved horizontally (Fig. 3B).

7. Claims 21-22, 31-38, 40-43, 51-52, and 56-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238 and Wadley '314 as applied to claims 1-4 above, and further in view of Swanson (U.S. Patent 6,537,607, hereafter '607).

'688, '316, '167, Burrows, Ardaillon '238, and '314 are discussed above. They do not explicitly teach moving the substrate and the source in relation to one another nor patterning without using a mask.

'607 teaches moving the substrate and organic electroluminescent sources relative to one another in order to create striped areas of different colors (col. 5, lines 4-28). The patterns are formed without using a mask (col. 2, lines 14-27). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have move the substrate and the depositional source relative to one another without using a mask in order to have provided colored stripes in the device of '688.

Claims 31-33 and 41: The strips may be 500 (i.e., several hundred)-1000 microns wide (col. 5, lines 30-38). The port must have a diameter equal to or more than smaller than the strip width because diffusion of the materials will make the material expand after emission. Furthermore, the size of the port affects the pressure inside the cell. It has been held the discovery of optimum value of result effective variable in known process is ordinarily within skill of art. *In re Boesch and Slaney*, 205 USPQ 215 (CCPA 1980). Therefore, it would have been obvious to one of ordinary skill in the art

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at the time the invention was made to have optimized the diameter of deposition cell in order to have optimized the pressure within the effusion cell.

Claims 42-43: The substrate may be moved horizontally (Fig. 4).

8. Claims 23-24 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314 and Swanson '607 as applied to claims 21-22 and 38 above, and further in view of Nanto et al. (U.S. Patent 5,921,836, hereafter '836).

'688, '316, '167, Burrows, Ardaillon '238, '314, and '607 are discussed above. They do not explicitly teach moving the evaporation source. However, the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '836 teaches that phosphor stripes may be applied to display panels by moving the deposition sources (Abstract). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have moved the cell instead of the substrate of '688 and '607 with a reasonable expectation of success and with the expectation of similar results because '836 teaches that moving the deposition source is a suitable method of applying stripes to a substrate.

9. Claims 25-28 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238

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and Wadley '314 as applied to claims 1-4 above, and further in view of Eguchi et al. (U.S. Patent 4,672,265, hereafter '265).

'688, '316, '167, Burrows, Ardaillon '238, and '314 are discussed above. They do not explicitly teach that the evaporation cell is made of tungsten. However, The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07. '265 teaches that tungsten is an operative material for evaporation boats for electroluminescent materials (col. 11, lines 45-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used tungsten as the particular boat material of '688 with a reasonable expectation of success because '265 teaches that it is an operative boat material.

10. Claims 29-30 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314 and Swanson '607 as applied to claims 21-22 and 38 above, and further in view of Eguchi '265 for substantially the same reasons applied regarding claims 25-28.

11. Claims 44-47 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238

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and Wadley '314 as applied to claims 1-4 and 38 above, and further in view of Utsugi et al. (U.S. Patent 6,294,892, hereafter '892).

'688, '316, '167, Burrows, Ardaillon '238, and '314 are discussed above, but do not explicitly teach that the light emitting layer pattern has a width of 50-200 microns. However, the examiner takes Official Notice that it is well known in the art of organic electroluminescent devices to use pixels, which have widths in the claimed range. See, e.g., '892, col. 8, lines 42-52; col. 9, lines 62-65. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used such widths as the particular widths of deposition of '688, '316, '167, Burrows, Ardaillon '238, and '314 with a reasonable expectation of success because '892 teaches that such pixel dimensions are suitable for organic EL displays.

12. Claims 48-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314 and Peng '198 as applied to claims 21-22 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

13. Claims 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314 and Swanson '607 as applied to claims 21-22 and 38 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

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14. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314, and Peng '198 as applied to claims 51 above, and further in view of Rallison '967 for substantially the same reasons applied regarding claims 9-12.

15. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314, and Swanson '607 as applied to claims 51 above, and further in view of Rallison '967 for substantially the same reasons applied regarding claims 9-12.

16. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314, and Peng '198 as applied to claims 51 above, and further in view of Eguchi '265 for substantially the same reasons applied regarding claims 9-12.

17. Claim 54 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314, and Swanson '607, as applied to claims 51 above, and further in view of Eguchi '265 for substantially the same reasons applied regarding claims 9-12.

18. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238,

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Wadley '314, and Peng '198 as applied to claims 51 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

19. Claim 55 is rejected under 35 U.S.C. 103(a) as being unpatentable over Antoniadis '688 in view of Nagashima '316, Onitsuka '167, Burrows, Ardaillon '238, Wadley '314, and Swanson '607 as applied to claims 51 above, and further in view of Utsugi '892 for substantially the same reasons applied regarding claims 44-47.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 10195639 discloses a known evaporation cell that includes a first portion and second portion, including a smaller diameter for the second portion and ejecting from the end portion of said second portion (Figure).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/
Division 1792
Patent Examiner



TIMOTHY MEEKS
SUPERVISORY PATENT EXAMINER